

CLAIMS:

1. A seat restraint tensioner for a seat restraint system in a vehicle comprising:

5 a cable having a first end and a second end, said first end being operatively connected to a seat restraint of the seat restraint system;

a movable mechanism connected to said second end of said cable to apply a force for tightening the seat
10 restraint when activated; and

a rotatable cam cooperating with said cable to generate a clamping force toward the seat restraint to clamp said cable between said cam and a clamping surface to prevent reverse travel of said cable after tightening
15 the seat restraint.

2. A seat restraint tensioner as set forth in claim 1 wherein said cam has a radius portion on one side and an eccentric portion on an opposite side, said cable
20 extending along a portion of said cam.

3. A seat restraint tensioner as set forth in claim 2 including a frame for operative connection to vehicle structure, said cam being pivotally connected to
25 said frame.

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4. A seat restraint tensioner as set forth in claim 3 wherein said frame comprises a base wall and opposed side walls extending from said base wall, said base wall including said clamping surface and said cam
5 being disposed between said side walls.

5. A seat restraint tensioner as set forth in claim 4 wherein said frame has an aperture extending through said base wall.

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6. A seat restraint tensioner as set forth in claim 5 including a cable fitting for connection to the seat restraint of the seat restraint system.

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7. A seat restraint tensioner as set forth in claim 6 wherein said first end of said cable is operatively connected to said cable fitting and said cable extends through said aperture along said cam and said second end of said cable is operatively connected to said
20 movable mechanism.

8. A seat restraint tensioner as set forth in claim 7 including at least one cable guide disposed in said aperture, said cable extending through said cable
25 guide.

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9. A seat restraint tensioner as set forth in claim 1 wherein said movable mechanism comprises a housing for operative connection to vehicle structure, a movable piston disposed in said housing, and a gas generator
5 operatively connected to said housing for expelling a gas to move said piston.

10. A seat restraint tensioner as set forth in claim 9 wherein said piston includes an annular groove
10 therein and a seal disposed in said groove to prevent gases from exiting past said piston.

11. A seat restraint tensioner as set forth in claim 9 wherein said piston includes a passageway
15 extending longitudinally therethrough, said cable extending through said passageway.

12. A seat restraint tensioner as set forth in claim 11 including a clamp connected to said cable to
20 prevent said cable from exiting said passageway.

13. A seat restraint tensioner as set forth in claim 9 wherein said housing comprises a piston portion extending longitudinally and a gas generation portion
25 extending longitudinally from said piston portion, said

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gas generation portion having a diameter larger than said piston portion.

14. A seat restraint tensioner as set forth in
5 claim 13 including a retainer disposed in said gas generation portion of said housing to retain said gas generator.

15 10 claim 9 wherein said gas generator comprises a pyrotechnic device to expel a gas.

16. A seat restraint tensioner for a seat
restraint system in a vehicle comprising:
15 a frame for operative connection to vehicle structure;

a housing connected to said frame;

a movable piston disposed in said housing;

20 a cable fitting for connection to a buckle assembly of the seat restraint system above said frame;

a cable having one end operatively connected to said cable fitting and another end operatively connected to said piston;

25 a gas generator operatively connected to said housing for expelling a gas to move said piston to apply a force for pulling-down the buckle assembly; and

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a rotatable cam pivotally connected to said frame and having a lever arm and clamping surface on the same side of a pivot for said cam, said cam cooperating with said cable to generate a clamping force on said cable
5 toward the buckle assembly to prevent reverse travel of said cable after pulling-down the buckle assembly.

17. A seat restraint tensioner as set forth in claim 16 wherein said housing comprises a piston portion
10 extending longitudinally and a gas generation portion extending longitudinally from said piston portion, said gas generation portion having a diameter larger than said piston portion.

18. A seat restraint tensioner as set forth in claim 17 wherein said gas generator comprises a pyrotechnic device connected to said housing to expel a gas in said gas generation portion.
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19. A seat restraint tensioner as set forth in claim 16 wherein said cam has a radius portion on one side and an eccentric portion on an opposite side, said cable extending along said eccentric portion of said cam.
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20. A seat restraint tensioner as set forth in claim 16 wherein said frame comprises a base wall and
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opposed side walls extending from said base wall, said base wall including said clamping surface and said cam being disposed between said side walls.

5 21. A seat restraint tensioner as set forth in claim 20 wherein said frame has an aperture extending through said base wall.

10 22. A seat restraint tensioner as set forth in claim 21 including at least one cable guide disposed in said aperture, said cable extending through said cable guide.

15 23. A seat restraint tensioner as set forth in claim 16 wherein said piston includes an annular groove therein.

20 24. A seat restraint tensioner as set forth in claim 23 including a seal disposed in said groove to prevent gases from exiting past said piston.

25 25. A seat restraint tensioner as set forth in claim 16 wherein said piston includes a passageway extending longitudinally therethrough, said cable extending through said passageway.

26. A seat restraint tensioner as set forth in claim 25 including a clamp connected to said cable to prevent said cable from exiting said passageway.

5 27. A seat restraint tensioner as set forth in claim 16 including a retainer disposed in said gas generation portion of said housing to retain said gas generator.

10 28. A seat restraint system for a vehicle comprising:

 a buckle assembly;

 a frame for connection to vehicle structure of the vehicle, said frame having a clamping surface;

15 a housing connected to said frame;

 a movable piston disposed in said housing;

 a cable fitting connected to said buckle assembly;

 a cable having one end operatively connected to said cable fitting and another end operatively connected to said piston;

 a gas generator operatively connected to said housing for expelling a gas to move said piston to apply a force for pulling-down said buckle assembly; and

25 a rotatable cam pivotally connected to said frame and cooperating with said cable to generate a

clamping force toward said buckle assembly to clamp said cable between said cam and said clamping surface to prevent reverse travel of said cable after pulling-down said buckle assembly.

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